Modern Concepts of Cardiovascular Disease

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THE HEART AND ATHLETICS

The steadily rising mortality of heart disease during the past few years and the numerous cases and deaths from coronary artery disease have brought prominently into focus the question of the effect of competitive athletics upon the heart. Every time a man, who was in his younger days an athlete, dies from heart disease the newspaper account of his career often carries by innuendo the insinuation that because he was an athlete his heart was damaged.

So many factors enter into this very important question that it is difficult to arrive at the truth concerning the effect of athletics upon the heart. Factors such as inheritance, the effect of acute infections, the effect of diet upon the growing child, the effect of insufficient rest, etc., are not fully known and therefore in any evaluation of the effects of athletics upon the heart, a number of imponderable, but possibly most important, factors must be left out of consideration. Thus the problem is difficult and lends itself to a solution by prejudice and emotion.

The more one sees of the marvelous reserve force of the heart, the more respect one has for it. Beginning in embryonic life, it never ceases its activity until death supervenes. It responds to all calls of whatever nature made upon it.

Experiments made upon the rhythmic beating of strips of heart muscle reveal that it will contract indefinitely if given glucose, insulin and oxygen. These are the three substances necessary for the heart to carry on its work. Of these three the one most subject to variations is the oxygen. There is no storehouse for oxygen in the body so that the function of respiration, exchange of CO_2 and O_2, is intimately connected with the ability of the heart to do its work. Lack of oxygen for even a brief period causes the heart to dilate and this cause is the one most often operating in dilatation.

The heart muscle responds to stretching of its fibres just as the skeletal muscles respond. The strength of the contraction is a function of the length of the fibre within physiological limits. That is to say that adequate diastolic filling of the ventricles, so that they are put on tension, results in strong beats. Conversely, inadequate diastolic filling due to any cause will result in weak beats.

There is no doubt but that under certain circumstances other than lack of oxygen the heart can be permanently dilated and as a result will be less competent than a normal heart. Experimentally the dog's heart has been permanently dilated. In children and young adults we see permanent dilatation follow exercise too soon after a serious infection particularly after acute rheumatic fever and diphtheria. Sudden death from such a slight strain as rising to a sitting position from the recumbent position in the convalescence from diphtheria is well known. But whether the normal heart can be damaged by exercise is another story. Personally the writer does not believe that any amount of exercise can produce temporary or permanent damage to the normal heart with possibly one or two exceptions.

Deutsch and Kauf, two Viennese investigators, had a wonderful opportunity to study this question among a very large number of young people who were actively engaged in many kinds of sport. They found that occasionally a heart would become definitely enlarged, but after a period of rest it would return to its former size. This was particularly true of bicycle riders and swimmers, champions in their respective sports. They felt that this enlargement was not hypertrophy but dilatation. They also concluded that these hearts must have suffered from some muscle damage as the result of some childhood infection. They felt that the normal heart, the heart that had never suffered any damage to the muscle, could not be harmed by exercise.

This raises the interesting and important question of how soon after an infection should the child be allowed to resume activity. One might say in general that not enough rest is maintained after illness. The practitioners should have this in mind and err on the safe side.

It would be a great advance forward in the prophylaxis of heart disease if every athlete were examined at intervals and an orthodiagram of the heart made at every examination. This might be prohibitively expensive in smaller colleges and public schools but in universities where there is student health service it certainly could be done. It might be possible by such orthodiagraphic examinations to pick up the dilating hearts and thus protect the individuals from premature heart failure in later life.

How long must we continue to tell people that just a heart murmur, not located, is not necessarily a serious or disabling heart disease! Diastolic murmurs whether at the aortic valve or at the mitral valve may be indications to refuse competitive athletics to a youth, but provided the heart rate is not abnormally rapid, there is no sign of infection, the youth does not become breathless on exertion, the youth should do what he pleases, play what games he pleases. No one will know better than he when his limit has been reached. During the examination of some 40,000 young recruits at a camp in 1918 there were a number of youths with mitral stenosis, a number with aortic insufficiency who were athletes, some record holders, who were quite unaware that they had any heart abnormality. While it is recognized that men with such heart lesions had better not enter competitive sports, yet it shows again what the compensated heart, though mechanically embarrassed, can do. So it is evident that the child with a heart lesion should not necessarily be made into a "softie." The writer makes one exception. He urges such youths not to go in swimming beyond their depth and not to swim races or play water-polo.

The systolic murmur at the apex of the heart, where there is no evident left ventricular enlargement, has been viewed both with alarm and with complacency. Those of us who paid little attention to it have been rudely shocked by some follow-up studies made within the past few years upon a group of children. Maybe we have looked too lightly upon this murmur which possibly is not so innocent. However, no further studies have appeared and the writer for one feels that he will continue to view such murmurs as functional until more evidence is brought forward to prove them serious.*

What about the expectation of life of the college athlete? Is it true that he is more often and at an earlier age the victim of our modern disease, coronary occlusion? The best answer to these questions is given in the study from the Metropolitan Life Insurance Mortality Tables by Dr. Dublin. He says, "Taken by and large, it would appear that the group of college athletes studied presented a favorable mortality picture. The experience has been much better among recent graduates than the earlier ones with the single exception of those who were on the crews." Dublin rather expected the athletes to make a better showing because they were picked men usually from well-to-do-homes. However, he says, "It is, after all, a good deal of an assumption that the athletic type of build and great longevity go hand in hand. There are facts pointing the other way which we in the insurance business are gradually making note of. Those who arrive at a ripe old age are often small and physically underdeveloped people. Women live longer than men. Men of large frame and especially those who are inclined to become seriously overweight" (as many athletes do when they cease violent exercise and acquire sedentary positions) "give high mortality rates. . . . It is, therefore, possible that the type of man who is selected for athletic activity may, after all, not be cut out for extremely favorable longevity."

No statistics can take account of all the imponderable factors which enter into the lives of men after they leave college. The athlete, in the language of psychology, is an extrovert, he is apt to live harder and more intensively than his introvert college mate. Should not this apparent fact have a bearing on his longevity? Can athletics then be blamed for any slight differences in longevity? And they are slight. At twenty-two years the athletes had a life-expectancy of 45.56 years, the general group of graduates, 45.71 years. So, finally, we arrive at the working conclusion that no form of athletics with the possible exception of college rowing injures the normal heart. Activities within the limitations of capacity should be allowed to the damaged hearts. Infections have more serious consequences for the hearts with diseased valves than exercise alone. More care should be taken of the convalescence from infections and infectious diseases. Time and rest are the great healers and it is better to err on the side of too long convalescence.

What has been said applies only to the men and women under, let us say, forty years of age. No one in his right senses would expect to take the violent exercise at forty-five years that he took at twenty-five. Everyone, doctor and layman, knows that living year by year produces gradual wearing of the tissues, the process of growing old, so that in middle life subtle changes have taken place in all the organs. While you who are forty-five and over may feel as young as you did at twenty-five, you cannot put unlimited strain on your heart and expect it to respond as it used to. By this time one cannot speak of a normal heart. It can be and is not infrequently damaged, thus definitely shortening the life of the man or woman.

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* The editors regard many systolic murmurs (especially the louder ones) with somewhat greater concern, because of certain subsequent developments in some of them, although they agree with the attitude of allowing such patients fair freedom in physical activities.